REMARKS/ARGUMENTS

Claims 1-34 are pending.

The Examiner rejects claims 1-6, 8-18, and 24-29 under 35 USC 103(a) as being unpatentable over Thesen (US 2002/0130660); and rejects claims 7 and 19-23 under 35 USC 103(a) as being unpatentable over Thesen in view of Soman et al. Applicants respectfully traverse these rejections for at least the following reasons.

Independent Claim 1 recites "determining a candidate sagittal direction for a brain image, said brain image defined by brain volume data in a three-dimensional space associated with first, second and third directions, said first, second and third directions being orthogonal to each other, said candidate sagittal direction being the closest direction of said first, second and third directions to an actual sagittal direction" and this determination comprises "determining, from said first, second and third measure plots, which of said first, second and third directions is said candidate sagittal direction with a candidate plurality of slices associated therewith." (emphasis added). It is noted that the candidate sagittal direction is one of the first, second and third directions that is closest to the actual sagittal direction, but is not the actual sagittal direction when none of the first, second and third directions is in the actual sagittal direction.

In stark contrast, careful review of Thesen reveals that it fails to disclose or suggest a method in which a candidate sagittal direction for a brain image as defined in claim 1 is determined from three given directions associated with brain image data for defining the brain

image as recited in claim 1. Rather, Thesen discloses a method for operating a magnetic resonance apparatus, wherein orbital navigator echoes are used to determine if there is any positional change before obtaining a further image dataset. If there is a positional change, the location code and shim setting are readjusted to ensure that the image datasets obtained before and after the positional change are comparable. See Abstract and paragraph s [0032]-[0035] of Thesen. In fact, Thesen does not even mention the concept of "candidate sagittal" direction, or the word "sagittal." While orthogonal axial directions are shown in Figs. 6 and 7 of Thesen, there is no disclosure or suggestion in Thesen that it should be determined which one of the axial directions is closest to an actual sagittal direction, let alone any disclosure or suggestion how this can be done (see paragraphs [0044]-[0051] of Thesen).

The Examiner points to paragraphs [0032]-[0034], [0042], [0043], and [0037]-[0040] and Figs. 1, 4 and 5 of Thesen for disclosing the above noted features of claim 1. However, none of these paragraphs mention the word "sagittal", let alone describing determination of a candidate sagittal direction from given directions. Fig. 1 and paragraphs [0032]-[0040] disclose that navigator echo dataset is compared to the reference dataset for detecting any positional change of the head. Fig. 4 shows a first pair of lunes 41 and 42 and a second pair of lunes 46 and 47 for a reference dataset, and Fig. 5 shows spherical bands 51, 53, and 55 for a reference dataset (see paragraphs [0042] and [0043] of Thesen). Figs. 4 and 5 do not show any direction that represents an actual or candidate sagittal direction. There is also no discussion of actual or candidate sagittal direction in the related description for Figs. 4 and 5 (see paragraphs [0042] and [0043] of Thesen).

The Examiner has not provided a clear articulation of the reasons why the above noted features recited in claim 1, in combination with other features recited in claim 1, are considered by the Examiner as disclosed in Thesen, or obvious in view Thesen. It is respectfully submitted that to establish a *prima facie* case of obviousness, the Examiner must support the obviousness rejection by articulated reasoning with some rational underpinning; mere conclusory statements cannot sustain the rejection. See MPEP §2141 III, §2142.

As the Examiner has failed to show that Thesen discloses or suggests all of the recited elements of claim 1, it is respectfully submitted that the Examiner has failed to establish a *prima facie* case of obviousness of claim 1 in view of Thesen.

Likewise, it is respectfully submitted that the Examiner has failed to establish a *prima facie* case of obviousness of claims 2-10 and 25-29 in view of Thesen.

Independent claim 11 is directed to a method of determining an approximate location for a mid-sagittal slice from a plurality of slices of brain volume data. The method comprises "obtaining said brain volume data for said plurality of slices, where said plurality of slices is generally oriented parallel to a sagittal plane and said plurality of slices is positioned along an axis that is normal to said sagittal plane; determining a measure for each slice of said plurality of slices, wherein each said measure is determined based on said brain volume data contained in said each slice; and selecting a candidate mid-sagittal slice among said plurality of slices, based on identifying an optimal measure amongst said measures determined for said each slice of said plurality of slices."

As discussed above, Thesen does not even mention the word "sagittal." There is consequently no disclosure or suggestion in Thesen of any method for determining an approximate location for a mid-sagittal slice from a plurality of slices of brain volume data. The Examiner admits that Thesen does not disclose the use of slices. The Examiner merely asserts that "it would have been obvious to one of ordinary skill in the art to use slices" but has not pointed to any disclosure in Thesen for disclosing or suggesting a method of determining an approximate location for a mid-sagittal slice from a plurality of slices. As such, it is respectfully submitted that Thesen does not disclose or suggest all of the elements recited in claim 11, and the Examiner has failed to establish a *prima facie* case of obviousness of claim 11, and any claims dependent from claim 11, in view of Thesen.

Soman el al. disclose a technique to register an Echo-Planar Image-Magnetic Resonance Image (EPI-MRI) pair by minimizing the discrepancy between its joint intensity probability mass function and a previously learned one for a properly registered EPI-MRI pair. Soman et al. are not concerned with determining a candidate sagittal direction from multiple given directions, or determining a mid-sagittal slice from a plurality of slices. As Soman et al. do not cure the above defects of Thesen with regard to claim 1 or claim 11, it is respectfully submitted that the Examiner has also failed to establish a *prima facie* case of obviousness of claims 7 (dependent from claim 1) and 19-23 (dependent from claim 11 directly or indirectly) in view of Thesen and Soman et al.

For at least the above reasons, withdrawal of these rejections is respectfully requested.

New claims 30-34 are presented for consideration. Support for new claim 30 can be found at least in Figs. 1-3, 4A, 4B, at paragraphs [0010], [0034], [0035], [0038], [0041], [0043]-[0054], [0056]-[0080], and claims 11-20 of the specification as filed. In particular, Fig. 4A shows candidate slices 20 and 21, wherein the measure of energy or entropy of slice 20 or 21 is a global optimum among 37 slices normal to and along the same axial direction and on each side of slice 20 or 21 there are slices whose measures of entropy or energy are smaller than that of slice 20 or 21, depending on the particular measure used (also see paragraph [0057]). Fig. 4B shows candidate slices 27 and 28, wherein the measure of energy or entropy of slice 27 or 28 is a global optimum among 27 slices normal to and along the same axial direction and on each side of slice 27 or 28 there are slices whose measures of entropy or energy are smaller than that of slice 27 or 27, depending on the particular measure used (also see paragraph [0058]). Paragraph [0059] states that "Each optimal measure may, therefore, be considered to lead to the selection of an initial mid-sagittal slice, coordinates of pixels in which may provide a good starting simplex for the optimization technique used to determine a location for a final mid-sagittal plane." Support for new claim 31 can be found at least at paragraph [0052]. Support for new claim 32 can be found at least at paragraph [0043]. Support for new claim 33 can be found at least at paragraph [0049]. Support for new claim 34 can be found at least at paragraphs [0050] and [0060].

It is believed that new claims 30-34 are patentable over the cited references for at least the following reasons.

Specifically, independent claim 30 is directed to a method for processing a three-dimensional brain image, and recites "for each axis of three orthogonal axes, and for each slice of a plurality of slices in said brain image normal to and along said each axis, calculating a measure of entropy or energy from intensities of pixels in said each slice; identifying, with a processor, a candidate slice in said brain image whose measure of entropy or energy is a global optimum among measures of entropy or energy of the plurality of said slices normal to and along one of said axes, and wherein on each side of said candidate slice there are slices whose measures of entropy or energy are smaller than said measure of entropy or energy of said candidate slice; determining, with a processor, the location of a mid-sagittal slice in said brain image that represents the mid-sagittal plane in said brain image, using said candidate slice as an initial candidate for said mid-sagittal slice."

There is no disclosure or suggestion in any of the cited references, either along or in combination, for identifying a candidate slice as recited in claim 30 and using the identified candidate slice as a candidate for the mid-sagittal slice representing the mid-sagittal plane when determining the location of the mid-sagittal slice.

Conveniently, in the method as claimed in claim 30, the candidate slice may be identified based solely on the pixel intensities in selected slices of the brain image. Thus, the candidate slice may be identified without any *a priori* information on slice orientation, and application of the claimed method may be image-orientation independent and is not limited to images that have small tilt angles, as discussed in paragraph [0085] of the present application. In comparison, prior art methods for determining the location of the mid-sagittal plane may require *a priori*

information, may be image orientation dependent, or may have limited application, as discussed at paragraph [0009] of the present application.

Therefore, new claims 30, and its dependent claims 31-34, are believed patentable over the cited references.

The Description is amended to include a cross-reference to the related provisional application in compliance with 37 CFR 1.78(5)(i). This repeats an amendment filed on November 16, 2006. Because entry of the prior amendment was not acknowledged in the Office action, the amendment of the Description is submitted again at this time.

No new matter has been added by these amendments.

In view of the foregoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,

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